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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/014,880	12/11/2001	Salvatore Coffa	00CT18953324	2364

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EXAMINER

LE, DUNG ANH

ART UNIT PAPER NUMBER

2818

DATE MAILED: 03/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/014,880

Applicant(s)

COFFA ET AL

Examiner

DUNG A LE

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) 1-8 and 33-47 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-16, 19-26 and 29-32 is/are rejected.
- 7) ☒ Claim(s) 17, 27 and 28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 10.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Response to Preliminary Amendment

Preliminary Amendment filed on 11/21/2001 has been entered and made of record as Paper No. 6

In Preliminary Amendment, applicant cancels claims 1-8, claims without prejudice or disclaimer, and claims 9-47-are newly added and remained for examination in Paper No. 11 is acknowledged.

Priority

Acknowledge is made of applicants' claim for foreign priority base on an application VA2000 A 000042 filed in Italy on 12/15/2000.

It is noted that Applicants have filled a certified copy of said application as required by U.S.C 119, which papers have been placed of record in the file.

Oath/Declaration

The oath/declaration filed on 12/11/2001 is acceptable.

Election/Restriction

Applicant's election with traverse of claims 9-32 in Paper No. 6 is acknowledged.

Because Applicant did not distinctly and specifically point out the supposed error in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Applicants have the right to file a divisional, continuation or continuation-in-part application covering the subject matter of the non-elected claims 33-47.

The traversal is on the ground(s) that see the election paper. This is not found persuasive because the fields of search for method' and device claims are NOT coextensive and the determinations of patentability of method and device claims are different, that is process limitations and device limitations are given weight differently in determining the patentability of the claimed inventions. Also, the strategies for doing text searching of the device claims and method claims are different. Thus, separate searches are required.

The requirement is still deemed proper and is therefore made **FINAL**.

Information Disclosure Statement

This office acknowledges of the following items from the Applicant:

Information Disclosure Statement (IDS) filed on 12/11/2001 and made of record as Paper No.10. The references cited on the PTOL 1449 form have been considered.

Drawings

The drawings are objected to for the following reasons.

The drawings are objected to by the PTO Draftsperson for the reasons noted on the attached Notice of Draftsperson's Patent Drawings Review, form PTO-948.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Claims 12 and 13 line 2, "a sealent layer" is failing to provide proper antecedent basis for the claimed subject matter. In independent claim 25 (page 5, line 3), "a sealent layer" also is failing to provide proper antecedent basis for the claimed subject matter.

The specification has been checked to the extent necessary to determine the presence of all possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

Claim 18 is objected to because of the following informalities:

In claim 18, line 3, delete the term "forming the backplate" in order to particularly define the subject matter which Applicants regard as the invention.

In claim 1, line 3, delete the term "forming the at least one opening" in order to particularly define the subject matter which Applicants regard as the invention.

Claim Rejections

Claim Rejections - 35 USC § 112

Claims 12, 13 and 25 rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 12 and 13 line 2, "a sealent layer" is failing to provide proper antecedent basis for the claimed subject matter. In independent claim 25 (page 5, line 3), "a sealent layer" also is failing to provide proper antecedent basis for the claimed subject matter.

The remaining claims are dependent from the above rejected claims and therefore also considered indefinite.

Set of claims 9- 24.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9- 16 and 18-24 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Iwata et al. (5665250) in view of the following remark.

Iwata et al. teach process of fabricating a pressure sensor comprising:

forming a buried layer 21 of second conductivity type in a substrate 2 and forming an upper layer 6 of first conductivity type adjacent the buried layer;

forming at least one opening (location 22) to a depth sufficient to reach the buried layer 21 (fig. 8a);

selectively etching the buried layer through the at least one opening to make the buried layer porous (fig. 11, col 8, line 5);

forming a sacrificial layer 8 on the upper layer 6;

forming a backplate 12 over the sacrificial layer 8; and

removing the sacrificial layer 8 and porous buried layer 25 to thereby define a cavity and adjacent diaphragm for the pressure sensor (col 8, lines 5- 15)

Iwata et al. does not teach forming a buried layer 21 of second conductivity type in a substrate 2 of first conductivity type. But Iwata et al. disclose that a buried layer 21 in a substrate 2 having the same conductivity type (P-type).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form a buried layer of second conductivity type in a substrate of first conductivity type, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a

matter of obvious design choice. It is also known in the art that the P-type or N-type dopant are commonly used to form the P-type or N-type silicon substrate.

Regarding claim 10, Iwata et al. discloses the claimed invention as applied in claim 9, except for forming a plurality of holes in the backplate as cited in present claim 10. It would have been obvious to one having ordinary skill in the art at the time the invention was made to forming a plurality of holes in the backplate, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding claim 11, wherein the cavity 26 and adjacent diaphragm are shaped as concentric circular sectors (fig. 1).

Regarding claim 12, forming a sealant layer 22 for the at least one opening prior to forming the sacrificial layer; and etching the sealant layer to reopen the at least one opening before the removing (figs. 1 and 11 or figs. 11 and 12b)

Regarding claim 13, wherein the sealant layer 22 and the sacrificial layer 8 both comprise silicon oxide deposited by a PVAPOX technique .

Regarding claim 14, wherein the removing comprises oxidizing the porous buried layer and etching the oxidized porous buried layer 25 (col 8, line 10).

Regarding claim 15, wherein the oxidizing is carried out immediately after selectively etching the buried layer 21.

Regarding claim 16, wherein the etching comprises isotropically etching with an acid solution (col 8, line 10).

Regarding claim 18, Iwata et al. lacks of forming the backplate 12 comprises forming the backplate comprising polycrystalline silicon. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form the backplate in made off polycrystalline silicon, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Regarding claim 19, wherein selectively etching the buried layer 25 comprises electrochemically etching the buried layer using an electrolytic solution (col. 7, line 65 to neat column, line 5).

Regarding claim 20, Iwata et al. teach claimed invention as applied in claim 9, except for forming the at least one opening comprises forming a plurality of openings equally spaced apart as cited in current claim . It would have been obvious to one having ordinary skill in the art at the time the invention was made to form a plurality of openings equally spaced apart, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Regarding claim 21, wherein forming the at least one opening comprises forming the at least one opening 4 by masking and anisotropic plasma etching (fig. 1).

Regarding claim 22, forming the at least one opening comprises forming the at least one opening through a face of the substrate opposite the upper layer 6 (fig. 1).

Regarding claim 23, wherein forming the at least one opening comprises forming the at least one opening through a face of the upper layer 6 opposite the substrate (fig. 1).

Regarding claim 24, wherein the substrate 2 comprises monocrystalline silicon and the upper layer 6 comprises an epitaxial silicon layer.

Set of claim 25-32.

Regarding claim 25, Iwata et al. teach process of fabricating a pressure sensor comprising:

forming a buried layer 21 of second conductivity type in a substrate 2 and forming an upper layer 6 of first conductivity type adjacent the buried layer;

selectively treating the buried layer 21 through the at least one opening (fig. 8a); forming a sealant layer 22 for the at least one opening;

forming a sacrificial layer 8 adjacent the upper layer 6 and sealant layer 22; forming a backplate 12 over the sacrificial layer 8 with a plurality of holes therein fig. 9a);

etching the sealant layer to reopen the at least one opening; and removing the sacrificial layer and the treated buried layer to thereby define a cavity 26 and adjacent diaphragm for the pressure sensor (fig. 1 and fig. 12b).

Iwata et al. does not teach forming a buried layer 21 of second conductivity type in a substrate 2 of first conductivity type. But Iwata et al. disclose that a buried layer 21 in a substrate 2 having the same conductivity type (P-type).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to form a buried layer of second conductivity type in a substrate of first conductivity type, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. It is also known in the art that the P-type or N-type dopant are commonly used to form the P-type or N-type silicon substrate.

Regarding claim 26, wherein the cavity 26 and adjacent diaphragm are shaped as concentric circular sectors (fig. 1 and fig.12b).

Regarding claim 27, wherein removing comprises oxidizing the treated buried layer and etching the oxidized treated buried layer (col 8, line 5-15).

Regarding claim 30, this claim is rejected under the same rationale set forth above to claim 18

Regarding claim 31, this claim is rejected under the same rationale set forth above to claim 19.

Regarding claim 32, wherein the first layer comprises a substrate 2 and the second layer comprises an epitaxial layer 6 formed thereon; and wherein forming the at least one opening comprises forming the at least one opening through the epitaxial layer (fig. 1).

Reasons for Indication of Allowable Subject Matter

Claims 17, 28 and 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, since the prior made of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed limitations. –Iwata et al. (U.S. Patent No. 5665250) and Kaiser et al. (U.S. Patent No. 5659195), taken individually or in combination, do not teach the claimed invention having (Regarding claims 17 and 29) wherein the acid solution comprises a diluted solution of hydrofluoric acid and the etching is carried out at room temperature; (Regarding claim 28) wherein the oxidizing is carried out immediately after selectively treating the buried layer.

If Applicants are aware of better art than that which has been cited, they are required to call such to attention of the examiner.

When responding to the office action, Applicants' are advice to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dung A. Le whose telephone number is 703-306-5797. The examiner can normally be reached on Monday-Friday 8:00am-5: 30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 703-308-4910. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Dung A. Le
Examiner

